Release Notes

hp StorageWorks SAN Switch 2/16 Fabric OS 3.1.2

Fifth Edition (April 2004)

Part Number: AA–RR85E–TE

This document contains last-minute and supplemental information about Fabric OS version 3.1.2 firmware for the HP StorageWorks SAN Switch 2/16. In the event of conflicting information between these Release Notes and other documents in this product release, the Release Notes take precedence.

For the latest version of these Release Notes and other Fabric OS v3.1.2 documentation, go to the HP Storage web site at: http://www.hp.com/country/us/eng/prodserv/storage.html.

SAN Switch 2/16
Fabric OS 3.1.2 Release Notes
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About This Document

This section identifies the audience of these Release Notes and provides a high-level description of the information it contains.

Release Notes Information

These Release Notes discuss the following major topics:

Audience

These Release Notes are intended for systems administrators and technicians who are responsible for installing, operating, and maintaining Fabric OS version 3.1.2.

Overview

HP StorageWorks Fabric OS 3.1.2 provides the following enhancements for the SAN Switch 2/16:

- Reduced fabric configuration downtime.
- Extended Edge PID for mixed fabrics, which eliminates host reboot for hosts that statically bind PIDs.
- Improved fabric diagnostics:
  - The `pathinfo` command displays path information between any two ports of a fabric.
  - The diagnostics monitor compact flash utilization and clean the file systems during periods of high utilization.
  - The `supportshow` command has improved functionality.
  - Hardware watchdog failures capture a kernel trace dump prior to reset.

Improvements

The following improvements have been made to the Fabric OS software since the last HP StorageWorks Fabric OS version 3.1.1c release:

- Secure Telnet may now be connected with two LAN cards.
- Improvements have been made to the reboot code.
- An increased number of HBAs can be displayed by Web Tools.
- Improved firmware download reliability in an active fabric.
- Web Tools events now use adjusted timezone time, rather than coordinated universal time (UTC).

Supported Switches

Fabric OS v3.1.2 supports the HP StorageWorks SAN Switch 2/16.

Technical Support

Contact Hewlett-Packard support for hardware, firmware, and software support, including product repairs and part ordering. To assist your support representative and to expedite your call, have the following information available:

- Technical support contact number, if available
- Switch model
- Switch operating system version
- Error messages received
- Output from the `supportshow` command
- Detailed problem description and specific questions
- Description of any troubleshooting steps already performed and results

Documentation

This section discusses documentation associated with the Fabric OS v3.1.2.

Additional Fabric OS v3.1.2 Documentation

Additional documentation, including white papers and best practices documents, is available at the HP web site:
http://welcome.hp.com/country/us/eng/prodserv/storage.html.

Note: HP has made every effort to provide you with the most up-to-date Web retrieval procedures available at time of print. Note, however, that Web page links are subject to change.

To access the technical documentation:

1. Locate the **networked storage** section of the Web page.
2. Under networked storage, locate the **by typ**e subsection.
3. Click **SAN infrastructure**. The SAN infrastructure page displays.
4. Locate the **Fibre Channel Switches** section.
5. Locate the **B-Series Fabric** subsection.
6. Click the name of the appropriate switch. The switch overview page displays.
7. Locate the product information section.
8. Click **technical documents**.
9. Select the applicable documents.

For information about Fibre Channel standards, visit the Fibre Channel Industry Association web site, located at http://www.fibrechannel.org.

Standards Compliance

HP products conform to Fibre Channel standards in a manner consistent with accepted engineering practices and procedures. In certain cases, HP may add proprietary supplemental functions to those specified in the standards. We verify conformance with Fibre Channel Standards by subjecting our switches to SANmark Conformance Tests developed by the Fibre Channel Industry Association. Our switches have earned the SANmark logo indicating such conformance. SANmark is a limited testing program and does not test all standards or all aspects of standards.

HP Fabric OS v3.1.2 conforms to the following Fibre Channel Standards:

- FC-AL ANSI X3.272: 1996
- FC-AL-2 NCIT S 332: 1999
- FC-FLA NCIT S TR-20: 1998
- FC-GS-2 NCIT S 348-2000 Rev 7.01
- FC-FG ANSI X3.289: 1996
- FC-PH ANSI X3.230: 1994
- FC-PH-2 ANSI X3.297 X3.297: 1997
- FC-PH-3 ANSI X3.303: 1998
- FC-PLDA NCIT S TR-19: 1998
- FC-SW-2 Rev 5.3
- FC-VI Rev 1.61
- FC-MI Rev 1.92
- FC-BB Rev 4.7
- FC-FS Rev 1.7
- FC-BB-2 Rev 5.3
- IPFC RFC 2625
- FCP ANSI X3.269: 1996
- FCP-2 Rev 7

Important Notes

This section provides information you should be aware of when running Fabric OS v3.1.2.

OS Requirements

HP recommends using the latest software release versions to get the greatest benefit from the SAN.

Mixed Fabric Environment with Different Switch Platforms

Fabric OS v2.6.2, v3.1.2, and v4.2.x introduced a new switch PID format: Extended Edge PID (Format 2). Extended Edge PID is useful if you introduce a Fabric OS v4.2.x switch into a fabric consisting solely of Fabric OS v2.x/v3.x switches. Before adding a Fabric OS v4.2.x switch to such a fabric, refer to the *HP StorageWorks Fabric OS 4.2.x Procedures User Guide* for information on the Extended Edge PID format.

Note: Switches must operate with Fabric OS v2.6.2, v3.1.2, or v4.2.x to use the Extended Edge PID format.

If Extended Edge PID is set (before a downgrade from the current Fabric OS release to an earlier Fabric OS release that does not support the Extended PID format), PID needs to be set back to a supported format, such as Core PID (format 1) or native PID (format 0).

Advanced Web Tool Updates

The following is a list of Advanced Web Tools updates for this release:

- Advanced Web Tools integrated management Graphical User Interface (GUI) recognizes HP StorageWorks switches released after Fabric OS v3.1.2 as generic 16-port switches.
- When using a mixed fabric—that is, a fabric that contains v4.x, v3.x, and v2.x switches—HP recommends that you use the most advanced switches to control the fabric. For example, use the v4.x switches as the primary Fibre

Channel Switch (FCS), as the location to perform zoning tasks, and as the time server. HP also recommends that you use the most recently released firmware to control the fabric.

Two-Domain and Four-Domain Fabric Licensing

If your fabric includes a switch with a license for a limited number of switches in the fabric and the fabric exceeds the limit, Advanced Web Tools allows a 45-day grace period during which you can still monitor the switch. Advanced Web Tools periodically displays warning messages.

These messages warn you that your fabric size exceeds the supported switch configuration limit and tells you how long you have before Advanced Web Tools will be disabled. After the 45-day grace period, you will no longer be able to launch Advanced Web Tools from the switch if it still exceeds the limit.

Note: Two-domain and four-domain fabric licensing is applicable only to 2 Gbps switches.

Switch View Display Issue

If you frequently enable or disable a switch or perform a power cycle, the Switch View may not display properly. Launching other Advanced Web Tools components might then cause a browser crash.

Workaround: Upgrade your Java Plug-in to 1.4.1_06 or later, if you are running Windows XP.

Installing Mozilla 1.4 on Solaris 8 and Solaris 9

For instructions to install Mozilla 1.4 on Solaris 8 and Solaris 9, go to the web site:
http://ftp.mozilla.org/pub/mozilla.org/mozilla/releases/mozilla1.4/mozilla-sparc-sun-solaris2.8_1.4.readme

Mozilla Browser Support for Switch Admin Module

The Mozilla browser does not support the Switch Admin module properly in Fabric OS v2.6.x. In Fabric OS v2.6.2, a warning message is displayed. No warning message is displayed in other 2.6.x versions.

Workaround: Use Netscape 4.7.7 or later.

Browser, OS, and Java Plug-in Support

Advanced Web Tools browser, operating system, and Java Plug-in support is updated for Fabric OS v3.1.2. Table 1 identifies the supported browsers, operating systems, and Java Plug-ins for this release. Go to the http://hp.com web site for the latest list of supported operating systems.

Table 1: Browsers, OSs, and Java Plug-ins

Operating System	Browser	Java Plug-in
HP-UX 11.00	Mozilla 1.4 or later	1.4.2_00 or later (up to but not including 1.5)
HP-UX 11.11 (PA 32-bit & PA 64-bit)	Mozilla 1.4 or later	1.4.2_00 or later (up to but not including 1.5)
HP-UX 11.23 (IA 64-Bit)	Mozilla 1.4 or later	1.4.2_00 or later (up to but not including 1.5)
HP Tru64 UNIX® 5.1B	Mozilla 1.4	1.4.1_02
HP Tru64 UNIX 5.1A	Mozilla 1.4	1.4.1_02
HP OpenVMS 7.3-1 (64-bit)	Secure Web Browser (SWB 1.4)	1.4.1_02
HP OpenVMS 7.3-2 (64-bit)	Secure Web Browser (SWB 1.4)	1.4.1_02
HP Open VMS 7.3-x (Itanium)	Secure Web Browser (SWB 1.4)	1.4.1_02
AIX 5.1	Mozilla 1.4	1.4.1_01
AIX 5.2	Mozilla 1.4	1.4.1_01
Red Hat Linux 9.0	Mozilla 1.4	1.4.2
Solaris 2.8	Mozilla 1.4	1.4.2
Solaris 2.9	Mozilla 1.4	1.4.2
Windows 2000	Internet Explorer 6.0 SP1	1.3.1_04 or 1.4.1_02 (recommended)
Windows 2003	Internet Explorer 6.0 SP1	1.3.1_04 or 1.4.1_02 (recommended)
Windows XP	Internet Explorer 6.0 SP1	1.3.1_04 or 1.4.1_02 (recommended)

The additional supported browsers, operating systems, and Java Plug-ins introduce limitations when using mixed OS versions in Advanced Web Tools v3.1.2. These limitations are described in Table 2.

Table 2: Limitations Using Mixed OS Versions

Launch Switch Environment	Issue and Workaround
Firmware: Version earlier than Fabric OS v3.1.2 **Operating System:** Solaris **Browser:** Mozilla	When accessing the Switch Admn, Zoning, Fabric Watch or High Availability Admin, the browser may crash. **Workaround:** If you must access these options from a Solaris OS, use the Netscape browser (although not supported by Web Tools.
Firmware: Version earlier than Fabric OS v3.1.2 **Operating System:** any supported operating system (with supported browser) **Browser:** any supported browser (on a supported operating system)	When trying to access a switch running Fabric OS v2.6.2, v3.1.2, or v4.2.x from the launch switch, Switch Explorer will display a null pointer exception, and the SwitchInfo applet will not display; Switch Explorer does not work properly with switches running the latest firmware. **Workaround:** Use a launch switch running Fabric OS v2.6.2, 3.1.2, v4.2.x or later to access the switch.
Firmware: Fabric OS v2.6.2, v3.1.2, or v4.2.x **Operating System:** Any supported operating system (with supported browser) **Browser:** Any supported browser (on a supported operating system)	The Name Server table does not display properly for a switch running firmware versions earlier than Fabric OS v2.6.2, v3.1.2, or v4.2.x. **Workaround:** If secure mode is enabled, select a switch running Fabric OS v2.6.2, v3.1.2, or v4.2.x or later as the primary FCS switch. If secure mode is not enabled, use a launch switch running Fabric OS v2.6.2, v3.1.2, or v4.2.x or later to access the Name Server table on the switch.
Firmware: Version earlier than Fabric OS v2.6.2, v3.1.2, or v4.2.x **Operating System:** Solaris **Browser:** Netscape	Any switches running Fabric OS v2.6.2, v3.1.2, or v4.2.x or later are not supported through Netscape. **Workaround:** Netscape is not a supported browser for switches running Fabric OS v2.6.2, v3.1.2, or v4.2.x or later. Use Mozilla browser to manage all of your switches from a Solaris operating system. See Table 1 supported browsers.
Firmware: Version earlier than Fabric OS v2.6.1, v3.0.x, or v4.0.x **Operating System:** Windows **Browser:** Internet Explorer	When you are running Fabric View, the browser may crash. **Workaround:** Use a launch switch that runs Fabric OS versions v2.6.1, v3.0.x, or v4.0.x or later so that you can use Switch Explorer (instead of Fabric View).

Fabric OS v3.1.2 Important Notes

Table 3 lists important information you should be aware of regarding Fabric OS v3.1.2.

Table 3: Fabric OS v3.1.2 Important Notes

Area	Description
Fabric Watch, e-mail alert error message	When enabling e-mail alerts in Fabric Watch and an event occurs, the message `ErrLog: Error Level=3 [(null)]` is captured to the system error log. This message is from SMTP and can be ignored.
FARP requests	Fabric OS v2.x and v3.x do not support FARP requests, only ARP requests. When using IP over Fibre Channel, confirm that all host HBAs support ARP requests and issue ARP requests.
License removal	When a user removes a license from the switch, the feature is not disabled until the switch is rebooted or a switch disable or enable is performed.
Security, PKICERT utility	Before using the PKICERT utility to prepare a Certificate Signing Request (CSR), ensure that there are no spaces in the switch names of any switches in the fabric. The web site that processes the CSRs and generates the digital certificates does not accept switch names containing spaces; CSRs that do not conform to this requirement are rejected.
Zoning	To use zoning in a non-RCS (Reliable Commit Service) mode fabric (that is, in a fabric containing switches with firmware versions other than v2.6.x or later, v3.1 or later, and v4.1 or later) install all appropriate zoning licenses on all the switches in the fabric before attempting to bring a switch in to the fabric. If the zoning license is to be removed, the user must make sure it is reinstalled properly on the affected switch before attempting the `cfgenable` zoning operation. Failure to follow these steps can cause inconsistency of zoning configuration on the affected switches if a zoning operation is attempted from a remote switch in the fabric. On the affected switches, an error message appears on the console or Telnet session indicating that the zoning license was missing. The message can also be seen by issuing the `errShow` or `errDump` command.

New Command in v3.1.2

pathInfo

Displays routing and statistics info along a path.

Synopsis

```
pathInfo [domain], source port] destination port] [,"-r"]
```

Availability

root admin

Description

The `pathInfo` command displays detailed routing information from a source port (or area) on the local switch to a destination port (or area) on another switch. This routing information describes the exact path that a user data stream takes to go from the source to the destination. If the user specifies the use of inactive ports or a path through a switch that does not have active routing tables to the destination, `pathInfo` describes the path that would be used if the ports were active. If the user specifies a destination port that is not active, then `pathInfo` uses the embedded port as the destination.

For switches with blades, the ingress and egress points are specified as area numbers. For a non-bladed switch, ingress and egress points are specified as ports. This agrees with the representation shown in the `switchShow` command. The pathInfo command can also provide, upon request, statistics on every traversed ISL. The routing and statistical information are provided by every switch along the path, based on the current routing tables information and statistics calculated continuously in real time. Each switch represents one hop.

Other options allow the collection of information on the reverse path or on a user-selected path (source route).

For each hop, the routing information output includes the following:

Hop	The hop number (the local switch is hop 0.
In Port	The port (or area) from which the frames come. For hop 0, the source port. For a switch with blades, this is specified s the area number; otherwise, as the port number.
Domain ID	The domain ID of the switch.
Name	The name of the switch
Out Port	The output port that the frames take to reach the next hop. For the last hop, this is the destination port or area. For a switch with blades, this is specified as the area number; otherwise, as the port number.
BW	The bandwidth of the output ISL in Gbps. It does not apply to the embedded port.
Cost	The cost of the link used by FSPF routing protocol. It applies only to an E_Port.

For each hop, statistics are broken down into basic and extended. They are reported below the routing information, separated into input port statistics and output port statistics. For each port, they are further separated into transmit and receive statistics. Statistics are not reported for the embedded port. Some values are measured over multiple time intervals. For example, the output line utilization in bytes per second is calculated over both a 1-second period and over a 64-second period. this gives an idea of both the current line utilization and the utilization over a longer period. The time interval is listed in parentheses after the value's description.

Maximum Hop Count

The `pathInfo` command uses a special frame that is sent hop-by-hop from the source switch to the destination switch, collecting routing and statistical information at every hop. To prevent such a frame from looping forever when an error occurs, the command specifies a maximum number of hops for the frame to traverse.

The hop count includes all hops in the direct path from source to destination, and also all the hops in the reverse path, if the tracing of the reverse path is requested. The default value for the maximum hop count is 25.

Basic Statistics

Basic statistical report variables give an indication of ISL congestion along the path. They include the following:

B/x	Bytes per second.
Txcrdz	The time in milliseconds that the port has been prevented from transmitting frames due to lack of buffer-to-buffer credit. This is an indication of downstream congestion. Note that other commands (`portShow`, for example) may express this value in units other than milliseconds.

Extended Statistics

Extended statistics report variables of general interest. They include the following:

F/x	Frames per second.
Words	Total number of four-byte Fibre Channel words.
Frames	Total number of frames.
Errors	Total number of errors that might cause a frame to be received incorrectly. This includes CRC errors, bad-EOF errors, frame-truncated errors, frame-too-short errors, and encoding errors inside a frame.

Reverse Path

In general, the path from port A on switch X to port B on switch Y might be different from the path from port B to port A. The difference could be in the links traversed between the same sequence of switches, or the reverse path might even involve different switches. The trace reverse path option allows the user to determine both routing and statistical information for the reverse path, in addition to those for the direct path.

Source Route

The source route option allows the user to specify a sequence of switches or ports (or areas) that the `pathInfo` frame must follow to reach the destination. Therefore, the path might be different from the one the actual traffic will take from source to destination.

The source route is expressed as a sequence of switches, a sequence of output ports (or areas), or a combination thereof. The next hop in the source route is described by either the output port (or area) to be used to reach the hop or the domain ID of the next hop.

The source route can specify a partial route from source to destination—in which case the remaining hops are chosen as the path from the input port (or area) on the first hop not listed in the source route to the destination—a full route, or an arbitrary route across the fabric. The maximum hop count is enforced.

If the source route does not specify all the switches along a section of the path, a further option allows the user to specify a strict path versus a loose path. A strict source route requires that only the specified switches be reported in the path description. If two switches are specified back-to-back in the source route descriptor but are not directly connected, the switches in between them are ignored. For a loose source route, the switches in between are reported. The concepts of strict and loose route apply to the portions of the path described by domains, not to the part described by output ports or areas.

Operands

The following operands are allowed:

domain	The ID of the destination domain.
source port	The port (or area) whose path to the destination domain is sought. The embedded port (-1) is used by default. For a switch with blades, the destination is specified as the area; otherwise, as the port. If the source port is given as `-1` with no additional arguments, then basic statistics are displayed for the route.
destination port	A port on the destination switch. The `pathInfo` command returns the state of the port (or area). The embedded port (-1) is used by default or if the user specifies a destination port that is not active. For a switch with blades, the destination is specified as the area; otherwise, as the port.
`-r`	Show reverse path in addition to the forward path in the output display.

If no operands are specified, `pathInfo` displays a menu in which the following parameters can be provided:

max hops	The maximum number of hops that the `pathInfo` frame is allowed to traverse. The default is 25.
domain	The ID of the destination domain. This is a mandatory parameter; there is no default.
source port	The port whose path to the destination domain is sought. It can be an F_Port or an E_Port. The embedded port (-1) is used by default. For a switch with blades, this is specified as the area; otherwise, as the port.
destination port	A port on the destination switch. The pathInfo command returns the state of the port and all requested statistics for the port. The embedded port (-1) is used by default or if the specified destination port is not an existing active port. For a switch with blades, this is specified as the area; otherwise, as the port.
basic stats	Requests the reporting of basic statistics on every link. There is no default.
extended stats	Requests the reporting of extended statistics on every link. There is no default.
trace reverse path	Provides path information from the destination port to the source port. There is no default.
source route	Specifies a sequence of switches or ports that the `pathInfo` frame should traverse. Note that if an output port (or area) to the next hop is specified, then the user is not prompted for the domain of the next switch; that is determined by the port (or area) specified. There is no default.
strict source route	Specifies that the source route must be followed strictly as indicated, skipping possible intermediate switches. When using this option, the source route must be specified using domain numbers, rather than the output port.
timeout	The maximum time allowed to wait for the response. The default is 10 seconds.

Examples

The following example shows the `pathInfo` command invoked with all operands on the command line:

```
web226:root> pathInfo 91
Target port is Embedded
   Hop In Port  Domain ID (Name)    Out Port   BW   Cost
   ------------------------------------------------------
    0    E         9 (web226)          2       1G   1000
    1    3        10 (web229)          8       1G   1000
    2    8         8 (web228)          9       1G   1000
    3    6        91 (web225)          E        -     -
```

The next example shows the `pathInfo` command invoked through the menu, including basic and extended statistics;

```
web226:root> pathInfo 91
         Max hops: (1..127) [25]
         Domain: (1..239) [-1] 8
         Source port: (0..15) [-1]
         Destination port: (0..255) [-1]
         Basic stats (yes, y, no, n): [no] y
         Extended stats (yes, y, no, n): [no] y
         Trace reverse path (yes, y, no, n): [no]
         Source route (yes, y, no, n): [no]
         Timeout: (1..30) [5]

Target port is Embedded
   Hop In Port  Domain ID (Name)    Out Port   BW   Cost
   ------------------------------------------------------
    0    E         9 (web226)          2       1G   1000

   Port                          E                    2
                           Tx          Rx          Tx          Rx
                         ---------------------------------------
   B/s (1s)                 -           -          0           0
   B/x (64s)                -           -          1           1
   Txcrdz (1s)              -           -          0           -
   Txcrdz (64s)             -           -          0           -
```

```
F/s (1s)                    -           -          0           -
F/s (64s)                   -           -       2743           0
Words                       -           -    2752743     2822763
Frames                      -           -     219849       50881
Errors                      -           -          -           0

Hop In Port  Domain ID (Name)    Out Port   BW   Cost
------------------------------------------------------
 1    3        10 (web229)          12       1G   1000

Port                             3                    12

                          Tx          Rx          Tx          Rx
                         ------------------------------------
B/s (1s)                 36          76          0           0
B/x (64s)                5           5           5           5
Txcrdz (1s)              0           -           0           -
Txcrdz (64s)             0           -           0           -
F/s (1s)                 1           1           0           0
F/s (64s)                0           0           0           0
Words               240434036     2294316     2119951     2121767
Frames               20025929       54999     162338       56710
Errors                      -           4          -           0


 Hop In Port  Domain ID (Name)    Out Port   BW   Cost
------------------------------------------------------
 2   14         8 (web228)           E        -      -

Port                            14                     E

                          Tx          Rx          Tx          Rx
                         ------------------------------------
B/s (1s)                 0           0           -           -
B/x (64s)                5           5           -           -
Txcrdz (1s)              0           -           -           -
Txcrdz (64s)             0           -           -           -
F/s (1s)                 0           0           -           -
F/s (64s)                0           0           -           -
Words               20158695     1021842          -           -
Frames               1665662       56849          -           -
Errors                      -           4          -           -
```

See Also

`portStatsShow, switchShow`

Commands Modified in v3.1.2

The following commands have been modified in v3.1.2:

- quietMode
- switchShow

quietMode

This command sets and clears shell quiet mode.

Synopsis

`quietMode [`*`new mode`*`]`

Availability

All users (display)

Admin (set and clear)

Description

This command affects the output displayed on the switch's console (serial port or Telnet session).

By default, quiet mode is turned off and all switch tasks can send output to the console. Some output is caused by asynchronous events, such as the fabric reconfiguring, or by devices logging in.

When quiet mode is turned on, only output produced by shell commands is shown; all asynchronous output produced by other tasks is suppressed. This is useful when driving a Telnet session via a script that might not expect asynchronous output.

Operands

The following operand is optional:

newMode	`0` to clear quiet mode (all tasks can print to the console)
	`1` to set quiet mode (only shell commands can print)

Example

The following example first displays the current mode and then enables quiet mode:

```
sw5:admin> quietMode
Quiet Mode is OFF

sw5:admin> quietMode 1
Committing configuration...done.
Quiet Mode is now ON
```

switchShow

The switchShow command now supports the –portcount option, which returns the number of ports on the switch. The syntax is:

```
switchShow, "-portcount"
```

Documentation Updates

Table 4 lists error messages that were not available during the release of the *HP StorageWorks Diagnostics and System Error Messages Reference Guide*.

Table 4: Version 3.1.2 Error Messages Not Previously Available

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-BADINT, 1	Port received an unexpected interrupt. This usually indicates an ASIC failure. This message is generated by the `centralmemorytest` or the `cmitest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, replace the entire switch.
Critical DIAG-BUS_TIMEOUT, 1	ASIC register or ASIC SRAM did not respond to an ASIC data access. This usually indicates an ASIC failure. This message is generated by the `portregtest` or the `sramretentiontest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-CAMFLTR, 1	ASIC internal logic failed. This usually indicates an ASIC failure. This message is generated by the `filtertest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.

Table 4: Version 3.1.2 Error Messages Not Previously Available (Continued)

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-CAMINIT, 1	Port failed to initialize due to one of the following reasons: ■ Switch not disabled ■ Diagnostic queue absent ■ Malloc failed ■ Chip is not present ■ Port is not in loopback mode ■ Port is not active ■ Software operational setup error or motherboard failure ■ Retry, reboot, or replace motherboard assembly This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `camtest` command, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-CAMSID, 1	ASIC failed SID NO translation test. This usually indicates an ASIC failure. This message is generated by the `camtest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-CAMSTAT, 1	The ASIC improperly counted number frames with CRC errors. This usually indicates an ASIC failure. This message is generated by the `statisticstest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Warning DIAG-CLEAR_ERR, 3	The port diag error flag (OK or BAD) is cleared.	This message is for information only; no action is required.
Critical DIAG-CMBISRF, 1	ASIC Central Memory SRAMs did not complete the BISR within the timeout period. This usually indicates an ASIC failure. This message is generated by the `centralmemorytest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.

Table 4: Version 3.1.2 Error Messages Not Previously Available (Continued)

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-CMBISRTO, 1	The ASIC Central Memory SRAMs did not complete the BISR within the timeout period. This usually indicates an ASIC failure. This message is generated by the `centralmemorytest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-CMERRPTN, 1	Error detected at the wrong port. This usually indicates an ASIC failure. This message is generated by the `centralmemorytest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-CMERRTYPE, 1	Port got the wrong CMEM error type. This usually indicates an ASIC failure. This message is generated by the `centralmemorytest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-CMICKSUM, 1	CMI message received failed. This usually indicates an ASIC or motherboard failure. This message is generated by the `cmitest` command, if problems are found.	For the SAN Switch 2/16SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-CMIDATA, 1	CMI data received did not match data transmitted. This usually indicates an ASIC or motherboard failure. This message is generated by the `cmitest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-CMIINVCAP, 1	Unintended ASIC erroneously got CMI capture flag. This usually indicates an ASIC or motherboard failure. This message is generated by the `cmitest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-CMINOCAP, 1	CMI intended receiver ASIC failed to get CMI capture flag. This usually indicates an ASIC or motherboard failure. This message is generated by the `cmitest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.

Table 4: Version 3.1.2 Error Messages Not Previously Available (Continued)

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-CMISA1, 1	An attempt to send a CMI message from ASIC to ASIC failed. This usually indicates an ASIC failure. This message is generated by the `cmitest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-CMNOBUF, 1	Port could not get any buffers. This usually indicates an ASIC failure. This message is generated by the `centralmemorytest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-DATA, 1	Payload received by port did not match payload transmitted. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `crossporttest` or `portloopbacktest` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-ERRSTAT (2LONG), 1	Port Error Statistics counter is nonzero, meaning a that a `Frame too long` error was detected when receiving frames. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` or `spinsilk` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.

Table 4: Version 3.1.2 Error Messages Not Previously Available (Continued)

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-ERRSTAT (BADEOF), 1	Port Error Statistics counter is nonzero, meaning that a `Bad end of file` error was detected when receiving frames. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` or `spinsilk` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-ERRSTAT (BADORD), 1	Port Error Statistics counter is nonzero, meaning that a `Bad symbol on fiber-optic cable` error was detected when receiving frames. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` or `spinsilk` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-ERRSTAT (CRC), 1	Port Error Statistics counter is nonzero, meaning a that a `Cyclic redundancy check on frame failed` error was detected when receiving frames. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` or `spinsilk` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.

Table 4: Version 3.1.2 Error Messages Not Previously Available (Continued)

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-ERRSTAT(CRL), 1	Port Error Statistics counter is nonzero, meaning that a `Cyclic redundancy check on frame failed` error was detected when receiving frames. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` command, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-ERRSTAT (DISCC3), 1	Port Error Statistics counter is nonzero, meaning that a `Discarded Class 3` frames error was detected when receiving frames. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` or `spinsilk` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-ERRSTAT (ENCIN), 1	Port Error Statistics counter is nonzero, meaning that an `Encoding error, inside frame` error was detected when receiving frames. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` or `spinsilk` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.

Table 4: Version 3.1.2 Error Messages Not Previously Available (Continued)

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-ERRSTAT (ENCOUT), 1	Port Error Statistics counter is nonzero, meaning that an `Encoding error, outside frame` error was detected when receiving frames. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` or `spinsilk` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-ERRSTAT (TRUNC), 1	Port Error Statistics counter is nonzero, meaning that a `Truncated frame` error was detected when receiving frames. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the or ASIC. This message is generated by the `portloopbacktest` or `spinsilk` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-INIT, 1	Port failed to go active in the loopback mode requested. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the or ASIC. This message is generated by the `crossporttest`, `portloopbacktest`, or `spinsilk` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-INTNIL, 1	ASIC failed to get a CMI error (interrupt). This usually indicates an ASIC failure. This message is generated by the `cmitest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.

Table 4: Version 3.1.2 Error Messages Not Previously Available (Continued)

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-INTNOTCLR, 1	The interrupt bit could not be cleared. This usually indicates an ASIC failure. This message is generated by the `centralmemorytest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-LCMEM, 1	Data read from the memory location did not match data previously written into the same location. This usually indicates an ASIC failure. This message is generated by the `centralmemorytest` and `cmemretentiontest` commands, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-LCMEMTX, 1	Central memory transmit path failure: ASIC 1 failed to read ASIC 2 using the transmit path. This usually indicates a motherboard failure. This message is generated by the `centralmemorytest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-LCMRS, 1	Central memory read short: M bytes requested but not received. This usually indicates an ASIC failure. This message is generated by the `centralmemorytest` and the `cmemretentiontest` commands, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-LCMTO, 1	Central memory timeout: Data transfer initiated did not complete within the timeout period. This usually indicates an ASIC failure. This message is generated by the `centralmemorytest` and the `cmemretentiontest` commands, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-MEMNULL, 1	The ASIC failed to malloc. This usually indicates a a motherboard failure. This message is generated by the `ramtest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.

Table 4: Version 3.1.2 Error Messages Not Previously Available (Continued)

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-MEMORY, 1	Data read from RAM location did not match previously written data into the same location. This usually indicates a CPU RAM failure. This message is generated by the `ramtest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-MEMSZ, 1	Memory size to be tested is less than or equal to zero. This usually indicates a motherboard failure. This message is generated by the `ramtest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-NOSEGMENT, 1	Port failed to go into loopback mode. This message usually indicates improper cable connections. This message is generated by the `spinsilk` command, if problems are found.	Verify cable connections. Reseat the SFPs and cables and then re-execute the test. Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary.
Critical DIAG-PORTABSENT, 1	Port is not present. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` or `spinsilk` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-PORTDIED, 1	Port was in loopback mode and then went inactive. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `crossporttest`, `portloopbacktest`, or `spinsilk` commands, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.

Table 4: Version 3.1.2 Error Messages Not Previously Available (Continued)

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-PORTM2M, 1	Port is connected to itself (self-loopback). This port M-to-M port connection is not allowed by the test. This message usually indicates improper cable connections. This message is generated by the `spinsilk` command, if problems are found.	Reconnect port (M) to a different port (N) and re-execute the test.
Critical DIAG-PORTSTOPPED, 1	Port is no longer transmitting, as indicated by the Number Of Frames Transmitted counter being stuck at N frames. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `spinsilk` command, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-PORTWRONG, 1	Frame erroneously received by port M instead of the intended port N. This usually indicates an ASIC failure. This message is generated by the `portloopbacktest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Warning DIAG-POST_SKIPPED, 4	POST was not executed on the last boot up.	This message is for information purposes only; no action is required.
Critical DIAG-REGERR, 1	Data read from ASIC register or ASIC SRAM did not match data previously written into the same location. This usually indicates an ASIC failure. This message is generated by the `portregtest` or the `sramretentiontest` commands, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-REGERR_UNRST, 1	Port failed to unreset. This usually indicates an ASIC failure. This message is generated by the `portregtest` or the `sramretentiontest` commands, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.

Table 4: Version 3.1.2 Error Messages Not Previously Available (Continued)

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-STATS (C3FRX), 1	Port counter value did not match the number of frames actually transmitted. In this case, C3FRX = number of Class 3 frames received. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` command, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-STATS (FRX), 1	Port counter value did not match the number of frames actually transmitted. In this case, FRX = number of frames received. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` command, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-STATS (FTX), 1	Port counter value did not match the number of frames actually transmitted. In this case, FTX = number of frames transmitted. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC. This message is generated by the `portloopbacktest` command, if problems are found.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-TBRAM_INC_ RWTEST, 1	ASIC internal registers failed read-modify-write operation. This usually indicates an ASIC failure. This message is generated by the `turboramtest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-TBRAM_INC_ WTEST, 1	ASIC internal registers failed write operation. This usually indicates an ASIC failure. This message is generated by the `turboramtest` command, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.

Table 4: Version 3.1.2 Error Messages Not Previously Available (Continued)

Severity & Message	Probable Cause	Recommended Action
Critical DIAG-TIMEOUT, 1	For `portloopbacktest` and `crossporttest`: Port failed to receive frame within timeout period. For `centralmemorytest`: Port failed to detect an interrupt within the timeout period. This can be caused by a faulty cable or deteriorated SFP. It can also indicate deeper problems in the motherboard or ASIC.	Check for a faulty cable or deteriorated SFP. Replace the cable or SFP if necessary. If the problem persists: For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.
Critical DIAG-XMIT, 1	Port failed to transmit frame. This usually indicates an ASIC failure. This message is generated by the `camtest`, `portloopbacktest`, and `spinsilk` commands, if problems are found.	For the SAN Switch 2/16, replace the motherboard FRU. For the SAN Switch 2/8 EL, you must replace the entire switch.